REMARKS

1. The Amendments and the Support Therefor

No amendments are made in view of the arguments below. A clean copy of the claims is provided for the Examiner's convenience.

2. Rejection of Claims 34 and 35 under 35 USC §102(b) in view of U.S. Patent 4,416,914 to *Eichelberger et al.*

Kindly reconsider this rejection. As noted in Section 3 (page 5) of the prior Response, an antioxidant is important in the recited ink because it is applied lithographically, in very thin layers, and is therefore prone to auto-oxidation without an antioxidant. We submit that the "stabilizer" of *Eichelberger et al.* – which applies inks in thicker layers (by screen printing, see column 8 line 56 and elsewhere) – does not constitute the recited "antioxidant." Please note that in the field of printing and ink-printed circuit boards, the term "stabilizer" is generally used to refer to a material which assists in press stability, i.e., which maintains an ink in a flowable form *while on a printing press*. See, e.g., U.S. Patent 4,403,550 to *Sharp* ("Process for planographic printing") at column 3 lines 51-64:

> Press stability is, therefore, not as good with Driography as it is with conventional wet lithography. By press stability is meant the ability of the ink, under press-operating conditions (e.g., temperatures and shear rates), to move through the press (e.g., through the rollers, plate and blanket and transfer to and from the printing plate) and the tendency of the ink not to dry in the roller train, plate and blanket. The application and form rollers in the printing process both supply ink and keep the printing plate clean by removing ink from the non-image areas of the plate. An ink has low press stability when the ink dries in the roller train, on the printing plate or blanket, or if the ink fails to transfer from the form rollers to the printing plate.

See also, e.g., the abstract (and elsewhere) of U.S. Patent 4,327,011 to *Ripley et al.* ("Printing ink and vehicle therefor"), discussing press stability of an ink on a roller train. In contrast, and antioxidant is commonly regarded as a *different* type of additive, one which prevents oxidation of the ink while on the shelf so that it does not set/dry *prior to printing operations*. See, e.g., U.S. Patent 4,654,082 to *Frilette* ("Antioxidant gravure printing inks and process of employing the same") at column 3 line 56-column 4 line 8:

> It has been general practice not to include non-fugitive antioxidants in printing inks. For inks which dry by oxidation of a drying oil or oleoresinous film, such inclusion prevents drying. But because certain of such compositions may form a skin on storage or when on the press, a minute amount of fugitive antioxidant such as guaiacol (2-methoxyphenol), which boils at 205.degree. C, is sometimes used. Its evaporation after printing allows drying by oxidation to proceed. Since rotogravure inks do not form skins on storage, there has been no reason to incorporate antioxidants.
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> U.S. Pat. No. 3,375,120 to Remer discloses the use of antioxidants in compositions designed to be applied at the boiling point of the solvent for manufacture of functional coatings. The antioxidant is used to preserve the quality of the functional coatings during long-term storage or during long periods of exposure to outdoor conditions. U.S. Pat. No. 4,077,807 to Kramer et al discloses an ink composition for ball point pens, which is not a gravure ink as defined herein and is devoid of volatile solvent.

A stabilizer is therefore not an antioxidant (and vice versa); they have totally different functions. This is demonstrated by the numerous patents in the printing field which describe the separate use of stabilizers and antioxidants. See, e.g., U.S. Patent 6,218,446 to *Arnold et al.* ("Radiation curable formulation for producing electrically conductive resinous material, method of use, and article produced") at column 10 line 58-column 11 line 5:

> Other materials may be incorporated into the instant formulations in addition to the components hereinabove described, to the extent that doing so is consistent with the objects set forth and the foregoing disclosure. For example, "inert" fillers such as wood flour, cornstarch, glass elements, cotton linters, mica, alumina, silica, and the like, may be used . . . . Substances such as dyes, flame retarders, ***stabilizers*** (e.g., the quinones and hydroquinones), viscosity modifiers (thixotropes, whether or not conductive, thickeners, viscosity reducers), plasticizers, ***antioxidants***, and the like, may be incorporated as well.

See also U.S. Patent 6,169,125 to *Arnold* ("Electrically conductive resinous material and radiation curable formulation for producing the same") at column 10 lines 23-37 for a similar passage. U.S. Patent 5,733,823 to *Sugioka et al.* ("Prepreg for printed circuit board and substrate for printed circuit using said prepreg") similarly makes separate mention of stabilizers and antioxidants at column 10 lines 30-37:

> The above-described flame retardative resin composition may be incorporated as necessary with any of various additives such as a halogen scavenger, ***a stabilizer***, ***an antioxidant***, a nucleating agent, a light stabilizer, a lubricant, a plasticizer, an antistatic agent, a mold release agent, a colorant and a thermoplastic resin other than the components of the present resin composition insofar as the object of the invention is not impaired thereby.

Numerous other references also make separate mention of antioxidants and stabilizers as well, e.g., U.S. Patent 4,943,606 to *Inoue et al.* ("Resin composition for printed circuit board") at column 8 lines 15-22; U.S. Patent 4,853,423 to *Walles et al.* ("Curable polyphenylene ether-polyepoxide compositions useful in printed circuit board production") at column 9 lines 53-63; and U.S. Patent 4,389,453 to *Kitanaka et al.* ("Reinforced polyphenylene sulfide molded board, printed circuit board including this molded board and process for preparation thereof") at column 3 lines 58-65, among others.

Therefore, in summary, we submit that the inks noted by *Eichelberger et al.* (with stabilizers) do not amount to the inks (with antioxidant) recited in claims 34-35. If it is nevertheless believed that *Eichelberger et al.*'s "stabilizers" constitute antioxidants and the rejection is maintained, kindly present evidence of this point so that the Applicant may better respond.[1]

Additionally, stepping from the issue of anticipation to the issue of nonobviousness, there would be no true motivation for one of ordinary skill to add an antioxidant to *Eichelberger*'s inks for the same reasons note in Section 3 of the prior Response with regard to U.S. Patent 4,759,970 to *Seeger, Jr. et al.*: the *Eichelberger* inks are not applied in thin layers, and additionally they are thermally cured (see column 7 lines 21-25 of *Eichelberger et al.*). In short, the *Eichelberger et al.* inks are in essence the same as those of *Seeger, Jr. et al.*, and we submit the rejections of claims 34 and 35 in view of *Eichelberger et al.* should be withdrawn on the same basis that the rejections in view of *Seeger, Jr. et al.* were withdrawn.[2]

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[1] "The factual determination of anticipation requires the disclosure in a single reference of every element of the claimed invention. . . . It is incumbent upon the examiner to identify wherein each and every facet of the claimed invention is disclosed in the applied reference." *Ex parte Levy*, 17 USPQ2d 1461, 1462 (Bd. Pat. App. & Int. 1990), *citing to Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick*, 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984); see also 37 CFR §1.104(c)(2), MPEP 707.07(d).

[2] We further note that the foregoing references which describe the separate use of antioxidants and stabilizers do not suggest the use of an antioxidant as recited in claims 34-35, since these describe inks having generally different compositions, used in generally different printing processes.

3. **Rejection of Claims 1-2 and 20-28 under 35 USC §103(a) in view of WO 97/48257, U.S. Patent 4,759,970 to *Seeger et al.*, and U.S. Patent 4,411,980 to *Haney et al.***

Kindly reconsider the rejection of claim 1. WO 97/48257 teaches the printing of a conductive ink to form a conductive circuit trace. The ink trace is not a seeding layer, since no further layers are deposited atop it; rather, the conductive ink itself forms the conductive trace. Looking then to *Seeger*, this reference teaches depositing a first thermosetting adhesive layer 12, a second particle-loaded (conductive) ink layer 13, and then a plated conductive layer 14 (see FIG. 2 and column 3 lines 38-47 of *Seeger*) to construct a circuit.

We submit that a skilled artisan who knew of WO 97/48257 and the *Seeger* and *Haney* references, and who had no knowledge of the invention recited in claim 1, would find no motivation in these references to combine their teachings to attain the invention of claim 1. WO 97/48257 teaches the construction of a circuit by simply using conductive ink to print the completed circuit; no suggestion is made that deposition of any further layers is necessary. *Seeger* does not alter this analysis, since *Seeger* teaches the construction of a circuit by a multistep process: by first depositing a nonconductive adhesive layer on a substrate, then a conductive ink layer on the adhesive layer, and then finally plating it to complete the circuit. Thus, when viewed objectively, it can be seen that the references would suggest that one should simply implement WO 97/48257 alone, without implementing a more cumbersome multistep process as in *Seeger*, since WO 97/48257 itself results in a completed circuit. However, as acknowledged by the Examiner, the process of WO 97/48257 is not the same as the one recited in claim 1.

Further, even if one assumed for some reason that WO 97/48257 should be modified in view of *Seeger*, the resulting process would first lay down a nonconducting adhesive layer before applying the conductive ink (as per *Seeger*) – and then a skilled artisan would reason that the conductive ink would be sufficient to complete the circuit (in accordance with WO 97/48257). But this does not amount to the claimed method, which recites that the ink is applied to the *substrate*, not to a prior adhesive layer. Further, even if one plated the ink layer as per *Seeger* and/or *Haney* to further enhance conductivity, the method would still not be the same as the one claimed, since the ink is still applied to the adhesive layer rather than the substrate. Thus, even

if the references were combined, they would not result in the claimed method.

Since the references, when viewed objectively without the use of hindsight, do not fairly suggest that they should be combined; and since the references, even if combined, do not result in the claimed invention; we submit that the method of claim 1 is unobvious. Kindly reconsider and withdraw the rejection. The remaining claims 2 and 20-28 are submitted to be allowable for at least the same reasons as claim 1.

4. In Closing

If any questions regarding the application arise, please contact the undersigned attorney. Telephone calls related to this application are welcomed and encouraged. The Commissioner is authorized to charge any fees or credit any overpayments relating to this application to deposit account number 18-2055.

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ATTACHMENTS:
- PTO-2038 ($475)